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EXAMINER	
HAN, QI	

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/606,807	LEE ET AL.6	
	Examiner	Art Unit	
	Qi Han	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46 and 48-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46 and 48-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09/30/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Information Disclosure Statement

2. The references listed in the Information Disclosure Statement submitted on 09/30/2004 have been considered by the examiner (see attached PTO-1449).

Response to Amendments

3. This communication is responsive to the applicant's amendment dated 09/27/2004. Applicant amended claims 9 and 20, and cancelled claim 47.

4. Examiner withdraws the disclosure objection regarding the abstract, because applicant made amendment for reducing the length.

Examiner withdraws the claim rejection regarding claim 20 under 35USC 112, 1st, because applicant made correction(s) and/or amendment(s).

Examiner withdraws the claim rejection regarding claim 47 under 35USC 112, 2nd, because applicant made cancellation.

Response to Arguments

5. With respect to rejection under 35 USC 112:

Regarding claim 31, the applicant fails to specifically disclose the claimed limitation of "the language model being trained in a second language", since in the argument applicant only pointed out the specific disclosure for **training typing models** in the specification (see page 16, paragraphs 2-3 and page 17, paragraph 1) that is not examiner's rejection. In addition, the limitation "each of **the** typing candidates" is referred back to the candidate using typing model being trained in a first language, while it is also used for the language model that is trained in a second language, which is confused and does not support by the specification either. The rejection will be retained.

6. With respect to rejection under 35 USC 102 and 103:

Applicant's arguments with respect to the claims 1-8, 26-29 and 48 have been fully considered but are not persuasive.

In response to applicant's arguments regarding claims 1-8, 26-29 and 48, under 35 USC 102, that "Chen (prior art) does not disclose, teach or suggest 'enabling a user to input an input string containing at least first and second languages without switching entry modes' " (amendment: pages 17-20), examiner respectfully disagrees with applicant and has a different view of the prior art teachings and the claim interpretations. It is noted that Chen discloses the system allowing 'a mixed Chinese (first language) and non Chinese (e.g., English—second language) text to be processed' and 'entering phonetic Chinese (Pinyin and BPMF) (herein inherently including string) into computer system' (column 4, lines 23-61); and further teaches

that 'mix text, both Chinese and non Chinese words, can be processed by delimiting the non Chinese words with a special character, e.g. a space'(column 4, lines 23-61), wherein the mixed text (string) containing Chinese Pinyin text and English text is only based on ASCII codes without any mode switch/control mechanism (corresponding to without switching entry modes) for the input string (column 4, lines 28-43 and column 10, lines 1-59), so that the disclosure is perfectly read on the claimed limitation, as stated in the rejection. Regarding the argument that Chen uses marked diacritics for the different Chinese tones (amendment, page 18, last paragraph to page 19, last paragraph), it is noted that Chen's invention does not need switch modes for inputting the mixed text, wherein Chen takes advantage of using tone information (diacritics) and at same time allows second language text, such English text, to be mixed with phonetic Chinese text (first language) and to be recognized for later processing step, without switching input/enter mode. Further, it is should pointed out that applicant did not indicate the claimed phonetic text using or not using diacritics (tones), so that the tone information (no matter how to represent them) may or may not be a part of the phonetic Chinese text, such as Pinyin text, and either of the situations can be read on the claimed limitation. It is also noted that without using the tone information, the conversing phonetic Chinese text to Chinese characters (Hanzi) would be inefficient, more complex, and with higher cost and more conversion errors, which is opposite to the applicant's object (specification, page 7, paragraph 2), wherein the tone information of Chinese phonetic text (Pinyin) can be represented by using numbers, special non-alphanumeric ASCII symbols, or extended/redefined keys on a computer keyboard (such Chen's disclosure, Figs. 2A-2D), which are all well known in the art.

Regarding claims 9-13, the response to applicant's arguments (amendment: pages 21-22) is based on the same reason as described for claim 1 (see above), because applicant argued same or similar issue(s) as claim 1. Further, since the amended claim includes new subject matter, please see detail in the claim rejection below.

In response to applicant's arguments regarding claims 14-25 and 49-50, under 35 USC 103, that "Neither Chen, the Examiner's Assertion, nor Hyde-Thomson, alone or in combination, discloses, teach or suggest the claimed aspects" (amendment: page 23, paragraph 1), "Chen, however, merely describes a mixed Chinese and non Chinese (e.g. English) text and does not disclose, teach or suggest the two determining step as claimed" (amendment: page 23, paragraph 2), "Neither Hyde-Thomson, Chen, nor the Examiner's Assertion, alone or in combination, discloses, teach or suggest the two "using" steps as claimed" (amendment: page 26, paragraph 1), and that applicant challenges the examiner's official notice (amendment: page 23, paragraph 3 to page 24, paragraph 4 and page 26, paragraph 2), examiner respectfully disagrees with applicant and has a different view of the prior art teachings and the claim interpretations. Firstly, it is noted that Chen discloses 'converting the phonetic input into the Hanzi form (first language)' (column 4, lines 28-61), and that 'if an erroneous spelling is detected 408 ..., the most probable (corresponding to a lowest probability of incorrectly entering the input string) syllable is displayed 409. This is done by presenting a menu of probable choices (at least one first candidate string), i.e. best match 1023, selected from the Chinese syllable list 700'(Fig. 4 and column 12, lines 35-66), which is read on the claimed limitation for the first "determining" step. Secondly, by reviewing Hyde-Thomoson, he discloses text-to-speech engines corresponding to multiple languages (including English) (column 5, lines 20-23), and teaches

that 'those skilled in the art will recognize that the trigraph analyzer 260 could return a set of language identifiers and a likelihood (interpreted as possibility) value corresponding to each language identifier (necessarily including a second candidates string corresponding to a second probability, which is corresponds to the claim and provides an evidence for supporting the official notice. Thirdly, a prior art (Mukaigawa et al., US 6246,976 B1) is provided as further evidence for supporting the official notice, which discloses using the occurrence probabilities of the character codes (string of languages) as evaluation value for judging (determining) the represented language or text code system (column 10, lines 12-30), wherein the disclosure can also satisfy the claimed limitation of the "two using" steps as claimed.

Regarding claim 23, the response to applicant's arguments is based on the same reason as described for claims 1 and 14 (see above), because the claims 1 and 14 cover same or similar limitation as claim 23. Further, for claims 49 and 50, the response has same or similar reason as claim 23.

Applicant's arguments with respect to claims 30-46 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

7. Claims 9-13, 31-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 9, the new amended limitation "receiving an input string containing first and second languages **that are represented with out using different text forms**" is not specifically described in the specification, which introduces a new subject matter.

Regarding claims 10-13, they are dependent claims and inherit all limitations of their parent claim(s).

Regarding claim 31, the claimed subject matter "the language model being trained in a second language" lacks sufficient support in the specification. The closest disclosure teaches that "the language input system employs a statistical language model" and "Both models (English and Chinese typing models) ... are guided by the language model (e.g., a Chinese language model) to output the most likely sequence of characters" (see specification: page 10, line 19 to page 11, line 8), and "a language model P(H) for Chinese" (see specification: page 28, lines 20-28), wherein Chinese refers to first language and English refers to second language, which suggests that only one language model for Chinese (first language) and nowhere teaches the language model being trained in a second language as claimed. Further, it is so confused that the limitation "each of **the** typing candidates" (in the second element) is referred back to the candidate using typing model being trained in a first language (in the first element), while this typing candidate it is also used for the language model being trained in a second language, which is not disclosed in the specification and even does not make any sense. Therefore, the claim and specification does not contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable one skilled in the art to make and/or use the claimed invention, without undue effort. As best

understand, the limitation "the language model being trained in a second language" will treated as no patent weight, hereinafter.

Regarding claim 31 (depending on claim 30), it inherits all limitations of its parent claim(s).

8. Claims 33, 44 and 50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 33, according to the claim, the typing error probability indicates how likely a candidate string was **incorrectly** entered, which means a candidate with highest typing error probability will be least selected. However, the third paragraph of the claim says, "to select ...with a **highest** typing error probability", which is contradictory statement and leads the claimed limitation being indefinite. As best understand, the limitation "to select... with highest typing error probability" will be interpreted as "to select... with a highest probability" hereinafter.

Regarding claims 44 and 50, rejection is based on the same reason described for claim 33, because the claims 44 and 50 have same or similar problem as claim 33 (see above).

Claim Rejections - 35 USC § 102

9. Claims 1-8, 26-29 and 48 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen (US 6,073,146).

Regarding **claim 1**, Chen discloses a system and method for processing Chinese language text (title), comprising:

enabling a user to input an input string containing at least first and second languages without switching entry modes (column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) text to be processed', 'entering phonetic Chinese (Pinyin and BPMF) (herein inherently including string) into computer system'; column 5, lines 11-13, 'mix text, both Chinese and non Chinese words, can be processed by delimiting the non Chinese words with a special character, e.g. a space', wherein the mixed text (string) containing Chinese Pinyin text and English text has no any mode switch/control mechanism, which is read on the claimed "without switching entry modes"); and

converting the input string to an output string that contains the first and second languages (column 4, lines 28-61, 'converting the phonetic input into the Hanzi form (string of first language)'; column 11, lines 46-62, 'non Chinese (e.g. English) words (string second language) can be further processed (output), e.g. spell checked').

Regarding **claim 2** (depending on claim 1), Chen further discloses that the first language is a primary language and the second language is secondary language used less frequently than the primary language, (column 7, line 12-9, ' "mixed language/text" is entered, i.e. English or other non Chinese text is included with the Chinese text input', 'non Chinese text is uncoded (unmarked) with a diacritic', which suggests that Chinese is primary language, and English or other non Chinese text is secondary language, which is inherently less frequently used than Chinese because Chen's major invention focuses on processing Chinese language text (see title).

Regarding **claim 3** (depending on claim 1), Chen further discloses applying a spelling model to the input string to derive output strings that correct spelling errors in the input string, (Fig. 4 and column 11, lines 60-61, 'spell checked 405', 'an abbreviation or alternate spelling 407', 'error checked 408'; column 12, lines 35-66, 'shorthand spelling', 'an erroneous spelling is detected 408', 'the most probable syllable is displayed 409', which suggests the system includes an equivalent mechanism as the claimed spelling model(s), for processing input string and outputting corrected string).

Regarding **claim 4** (depending on claim 1), Chen further discloses that the converting comprises applying a language model to the input string, (abstract, 'word string is analyzed using ... a statistical language model'; column 18, line 49, 'statistical model').

Regarding **claim 5**, Chen discloses a system and method for processing Chinese language text (title), comprising:

enabling a user to enter phonetic text and non-phonetic text as a common string without switching modes, (column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) text to be processed', 'entering phonetic Chinese (Pinyin and BPMF) (herein inherently including string) into computer system'; column 5, lines 11-13, 'mix text, both Chinese and non Chinese words, can be processed by delimiting the non Chinese words with a special character, e.g. a space', wherein the mixed text (string) containing Chinese Pinyin text and English text has no any mode switch/control mechanism, which is read on the claimed "without switching entry modes"); and

converting the phonetic text to corresponding language text, while leaving the non-phonetic text unconverted, (column 4, lines 28-61, 'converting the phonetic input into the Hanzi

form (language text)'; Fig. 4 and column 11, lines 47-55, 'non Chinese words can also be identified 403' and 'non Chinese (e.g. English) words (string second language) can be further processed (output), e.g. spell checked', which means that only Chinese phonetic text need to convert to another form of text (Hanzi), while non Chinese (like English) text need not to change the text form (unconverted)).

Regarding **claim 6** (depending on claim 5), as stated above, Chen discloses that the phonetic text is Chinese Pinyin (column 4, lines 23-61).

Regarding **claims 7-8** (depending on claim 5), the rejection is based on the same reason described for claims 3 and 4 respectively, because the claims 7 and 8 recite same or similar limitation(s) as claims 3 and 4 respectively.

Regarding **claims 26-29**, they recite a language input architecture. The rejection is based on the same reason described for claims 1-4 respectively, because the claims 26-29 recite same or similar limitation(s) as claims 1-4 respectively.

Regarding **claim 48**, it recites one or more computer-readable media. The rejection is based on the same reason described for claim 5, because the claim recites same or similar limitation(s) as claim 5.

Claim Rejections - 35 USC § 103

10. Claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen.

Regarding **claim 9**, as best understood in view of rejection under 35 USC 112, 1st (see above), Chen discloses a system and method for processing Chinese language text (title), comprising:

receiving an input string containing at least first and second languages that are represented without using different text forms (interpreted as without switching entry modes), (column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) text to be processed', 'entering phonetic Chinese (Pinyin and BPMF) (herein inherently including string) into computer system'; column 5, lines 11-13, 'mix text, both Chinese and non Chinese words, can be processed by delimiting the non Chinese words with a special character, e.g. a space', wherein the mixed text (string) containing Chinese Pinyin text and English text has no any mode switch/control mechanism, which is read on the claimed "without switching entry modes"); and

determining at least one candidate string in the first language that may be used to replace the input string, (column 4, lines 28-61, 'converting the phonetic input into the Hanzi form (first language)'; Fig. 4 and column 12, lines 35-66, 'an erroneous spelling is detected 408', 'the most probable syllable is displayed 409'). But, Chen does not expressly disclose that the step of determining candidate string stated above is "based on a **probability** of how likely the first candidate string was incorrectly entered as the input string in the first language". However, the feature of using probability for determining candidates is well known in the art as evidenced by Chen himself who further discloses using statistical model for the notional words (column 5, line 8), which is inherently based on probability calculations. Further, Chen teaches that 'If an erroneous spelling is detected 408 ..., the most probable (corresponding to a lowest probability of incorrectly entering the input string) syllable is displayed 409... presenting a menu of probable choices (at least one first candidate string), i.e. best match 1023, selected (replaced) from the Chinese syllable list 700' (Fig. 4 and column 12, lines 35-66). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Chen in

view of well known prior art by specifically providing statistical model based on probability calculation for the candidates, as taught by Chen, for the purpose of further removing ambiguity (Chen: column 5, lines 7-8) and selecting the most probable candidate for best matches (Chen: column 12, lines 64-66).

Regarding **claim 10** (depending on claim 9), Chen further discloses that selectively performing one of (1) converting the input string to the candidate string in the first language, or (2) leaving the input string in the second language, (column 4, lines 28-61, 'converting the phonetic input into the Hanzi form (language text)'; Fig. 4 and column 47-55, 'non Chinese (e.g. English) words can be identified 403', which suggest that the converting step is only for Chinese phonetic text, not for non Chinese words).

Regarding **claim 11** (depending on claim 9), the rejection is based on the same reason described for claim 2, because the claim recites same or similar limitation(s) as claim 2.

Regarding **claim 12** (depending on claim 9), as stated above, Chen discloses that the input string of the first language comprises phonetic text and the input string of the second language comprises non-phonetic text, (column 4, lines 23-61, 'entering phonetic Chinese (Pinyin and BPMF) (herein inherently including string) into computer system', 'allows a mixed Chinese and non Chinese (e.g., English) text (interpreted as non-phonetic text) to be processed').

Regarding **claim 13** (depending on claim 9), as stated above, Chen discloses that the first language is Chinese and the second language is English, (column 4, lines 23-61, 'entering phonetic Chinese (Pinyin and BPMF) (herein inherently including string) into computer system', 'allows a mixed Chinese and non Chinese (e.g., English) text (interpreted as non-phonetic text) to be processed').

11. Claims 14-25 and 49-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of well known prior art (MPEP 2144.03), and further in view of Hyde-Thomson et al. (US 6,487533 B2) herein after referenced by Hyde-Thomson.

Regarding **claim 14**, Chen discloses a system and method for processing Chinese language text (title), comprising:

receiving an input string containing at least first and second languages, (column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) text to be processed', 'entering phonetic Chinese (Pinyin and BPMF) (herein inherently including string) into computer system');

determining at least one first candidate string that may be used to replace the input string, (column 4, lines 28-61, 'converting the phonetic input into the Hanzi form (first language)'; Fig. 4 and column 12, lines 35-66, 'an erroneous spelling is detected 408', 'the most probable syllable is displayed 409'). But, Chen does not expressly disclose that the step of determining candidate string stated above is "based on a **probability** of how likely the first candidate string was incorrectly entered as the input string in the first language". However, the feature of using probability for determining candidates is well known in the art as evidenced by Chen himself who further discloses using statistical model for the notional words (column 5, line 8), which is inherently based on probability calculations. Further, Chen teaches that 'If an erroneous spelling is detected 408 ..., the most probable (corresponding to a lowest probability of incorrectly entering the input string) syllable is displayed 409... presenting a menu of probable choices (at least one first candidate string), i.e. best match 1023, selected (replaced) from the Chinese syllable list 700' (Fig. 4 and column 12, lines 35-66). Therefore, it would have been obvious to

one of ordinary skill in the art at time the invention was made to modify Chen by specifically providing statistical model based on probability calculation for the candidates, as taught by Chen, for the purpose of further removing ambiguity (Chen: column 5, lines 7-8) and selecting the most probable candidate for best matches (Chen: column 12, lines 64-66).

Chen further discloses determining at least one second candidate string that may be used to replace the input string, (column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) (second language) text to be processed', 'non Chinese words can further processed, e.g. spell checked (herein inherently including providing candidate for correcting misspelling) by known systems that process these languages'). But, Chen does not expressly disclose the step of determining second candidate based on a second probability of how likely the second candidate string was incorrectly entered as the input string in the second language. However, an official notice is taken that the feature of determining a candidate string based on a probability of correctness in the input string in English language (second language) is well known in the art. Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Chen by specifically providing a mechanism of determining a candidate string based on a probability of correctness in the input string in English language, for the purpose of improving reliability for the system.

Further, Chen in view of well known prior art does not expressly discloses "using the first candidate string if the first probability is higher than the second probability to derive at least one output string containing the first language; and using the second candidate string if the first probability is lower than the second probability to derive at least one output string containing the second language." However, this feature is well known in the art as evidenced by Hyde-

Thomson who discloses unified messaging system with automatic language identification for text-to-speech conversion (title), comprising that the trigraph analyzer examines a text sequence and performs language identification operations, determines a closest match, returns a corresponding language identifier and likelihood (herein interpreted as probability) value to the message inquiry unit (column 3, lines 6-17). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Chen in view of well known prior art by specifically providing a mechanism of determining language based on a likelihood value, as taught by Hyde-Thomson, for the purpose of identifying a language for further processing (Hyde-Thomson: column 7, lines 13-21).

Regarding **claims 15-18** (depending on claim 14), the rejection is based on the same reason described for claims 11-13 and 10 respectively, because the claims 15-18 recite same or similar limitation(s) as claims 11-13 and 10, respectively.

Regarding **claim 19** (depending on claim 14), Chen in view of well-known prior art in view of Hyde-Thomson further discloses obtaining the first and second candidate strings from a database, (Chen: column 5, line 8, statistical model'; column 6, lines 5-6, 'Chinese dictionary or vocabulary'; Hyde-Thomson: Fig. 4, 'library', 'dictionary', which is inherently equivalent to or includes database).

Regarding **claim 20** (depending on claim 14), Chen in view of well-known prior art in view of Hyde-Thomson further discloses:

deriving the first probability that the first candidate string was incorrectly entered from data collected from multiple users entering a training text in the first language, (Chen: column 4, lines 23-61, 'entering phonetic Chinese (Pinyin and BPMF) (first language) into computer

system'; Fig. 4 and column 12, lines 35-66, 'an erroneous spelling is detected 408', 'the most probable syllable is displayed 409', 'best matches'; column 5, line 8, 'statistical model'; which is inherently include probability calculation and training data for determining a candidate).

deriving the second probability that the second candidate string was incorrectly entered from data collected from multiple users entering a training text in the second language, (column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) (second language) text to be processed', 'non Chinese words can further processed, e.g. spell checked (including providing candidate) by known systems that process these languages'; column 5, line 8, 'statistical model'; Hyde-Thomson: column 3, lines 6-17, 'trigraph analyzer determines a closest match', 'returns a corresponding language identifier and likelihood value', which suggests that combined system is capable of including probability calculation and training data for determining a candidate as claimed).

Regarding **claim 21** (depending on claim 14), Chen in view of well known prior art in view of Hyde-Thomson further discloses displaying the output string in line with the input string being entered by a user, (Chen: Fig. 1, block 1020).

Regarding **claim 22** (depending on claim 14), the rejection is based on the same reason described for claim 14, because the claim recites same or similar limitation(s) as claim 14.

Regarding **claim 23**, it recites a method. The rejection is based on the same reason described for claim 14, because the claim recites same or similar limitation(s) as claim 14.

Regarding **claim 24** (depending on claim 23), Chen in view of well known prior art in view of Hyde-Thomson further displaying the input string containing the first and second

language in a single edit line; and selectively displaying the output string or the input string in the single edit line, (Chen: Fig. 1, block 1020).

Regarding **claim 25** (depending on claim 23), the rejection is based on the same reason described for claim 13, because the claim recites same or similar limitation(s) as claim 13.

Regarding **claim 49**, it recites one or more computer-readable media. The rejection is based on the same reason described for claim 23, because the claim recites same or similar limitation(s) as claim 23.

Regarding **claim 50**, it recites one or more computer-readable media. The rejection is based on the same reason described for claim 14, because the claim recites same or similar limitation(s) as claim 14.

12. Claims 30-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Mukaigawa et al., US 6246,976 B1. (US 5,510,998), hereinafter referenced by Mukaigawa.

Regarding **claim 31**, as best understood in view of claim rejection under USC 112, 1st (see above), Chen discloses a system and method for processing Chinese language text (title), comprising:

a typing model to receive an input string and determine a typing error of how likely a first candidate string was incorrectly entered as the input string, (column 4, lines 23-61, 'entering phonetic Chinese (Pinyin, as a string)', 'converting the phonetic input into the Hanzi form', 'key is struck (typing)', which is interpreted as functionality of a typing model; column 6, line 21, 'keyboard 1030 to enter Pinyin text input'; Fig. 4 and column 12, lines 35-66, 'an erroneous

spelling is detected 408, ... the most probable (relating lowest likelihood of incorrect input) syllable (candidate) is displayed 409'); and

a language model to provide output strings for each of the typing candidates, (Abstract: 'word string is analyzed using ... a statistical language model')

But, Chen does not expressly disclose "typing error probability". However, the feature of using a probability related to typing error for determining candidates is well known in the art as evidenced by Chen himself who further discloses using statistical model for the notional words (column 5, line 8), which is inherently based on probability calculations; and teaches that 'If an erroneous spelling (herein corresponding to typing) is detected 408..., the most probable (corresponding to a lowest probability of incorrectly entered input) syllable is displayed 409... presenting a menu of probable choices (at least one first candidate string), i.e. best match 1023, selected from the Chinese syllable list 700' (Fig. 4 and column 12, lines 35-66). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Chen by specifically providing using most probable candidate for the erroneous spelling (typing) and using statistical model with probability, as taught by Chen, so that the combined features can provide a typing error probability, for the purpose of further removing ambiguity (Chen: column 5, lines 7-8) and selecting best matches (Chen: column 12, lines 64-66).

Further, Chen does not expressly disclose the model "**being trained** in a first language". However, this feature is well known in the art as evidenced by Mukaigawa who discloses apparatus, method and storage medium for identifying a combination of a language and its character code system (title), and teaches that 'the occurrence probability for each character is previously found by statically processing (being trained) in the character appearing in various

documents in the past' and 'the occurrence probability may be obtained ... for each language (model)' (column 8, lines 16-27). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Chen by specifically providing a statistical processing for training in a language, as taught by Mukaigawa, for the purpose of obtaining language identification of a character code and occurrence probability data (Mukaigawa: column 8, lines 14-15).

In addition, in fact, a language related statistical model necessarily includes the functionality being trained in the language.

Regarding **claim 30** (depending on claim 26), the rejection is based on the same reason described for claim 31, because the claim recites same or similar limitation(s) as claim 31.

Regarding **claim 32** (depending on claim 31), the rejection is based on the same reason described for claim 2, because the claim recites same or similar limitation(s) as claim 2.

Regarding **claim 33**, Chen discloses a system and method for processing Chinese language text (title), comprising:

a first typing model to receive an input string and determine a first typing error [probability] of how likely a first candidate string was incorrectly entered as the input string, (column 19, lines, 'entering phonetic Chinese (Pinyin, as a string)' and 'converting the phonetic input into the Hanzi form' and 'key is struck (typing)', which is interpreted as functionality of a typing model; column 6, line 21, 'keyboard 1030 to enter Pinyin text input'; Fig. 4 and column 12, lines 35-66, 'an erroneous spelling is detected 408, ... the most probable (relating lowest likelihood of incorrect input) syllable (candidate) is displayed 409');

a second typing model to receive the input string and determine a second typing error [probability] of how likely a second candidate string was incorrectly entered as the input string, (column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) (second language) text to be processed', 'non Chinese words can further processed, e.g. spell checked (typing model), by known systems that process these languages' (inherently providing candidate for correcting misspelling based on likelihood, such as use of MS Word); column 5, line 8, 'a statistical model').

But, Chen does not expressly disclose "typing error probability". However, the feature of using a probability related to typing error for determining candidates is well known in the art as evidenced by Chen himself who further discloses using statistical model for the notional words (column 5, line 8), which is inherently based on probability calculations; and teaches that 'If an erroneous spelling (herein corresponding to typing) is detected 408..., the most probable (corresponding to a lowest probability of incorrectly entered input) syllable is displayed 409... presenting a menu of probable choices (at least one first candidate string), i.e. best match 1023, selected from the Chinese syllable list 700' (Fig. 4 and column 12, lines 35-66). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Chen by specifically providing using most probable candidate for the erroneous spelling (typing) and using statistical model with probability, as taught by Chen, so that the combined features can provide a typing error probability, for the purpose of further removing ambiguity (Chen: column 5, lines 7-8) and selecting best matches (Chen: column 12, lines 64-66).

Further, Chen does not expressly disclose a separate typing error probability for each of languages. However, this feature is well known in the art as evidenced by Mukaigawa who

teaches that 'the occurrence probability for each character is previously found by statically processing in the character appearing in various documents in the past' and 'the occurrence probability may be obtained ... for each language (model)' (column 8, lines 16-27), and using separate probabilities for each language character, as evaluation value, to for judging language characters (column 10, lines 12-30). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Chen by specifically providing separate probabilities for each language, as taught by Mukaigawa, for the purpose of obtaining language identification of a character (Mukaigawa: column 8, lines 14-15).

Moreover, Chen in Mukaigawa further discloses a search engine to select one of the first and second candidate strings with a highest [typing error] probability (Mukaigawa: column 10, lines 11-33, 'product of the occurrence probabilities of the character...is obtained as final evaluation value', 'the evaluation value...is the largest (corresponding to the highest probability)'; column 11, line 11, 'a search engine').

Regarding **claim 34** (depending on claim 33), as stated above, the combined system uses statistical model(s) (Chen: column 5, line 8) for both first language and second language, with training data in the languages (Mukaigawa: column 8, lines 16-27), which corresponds to the claimed "the first typing model is trained using a first language and the second typing model is trained using a second language."

Regarding **claim 35** (depending on claim 33), as stated above, the combined system uses statistical model(s) (Chen: column 5, line 8) for both first language and second language (Chen: column 4, lines 23-61, 'allows a mixed Chinese (first language) and non Chinese (e.g., English) (second language) text to be processed'), with training data in the languages (Mukaigawa:

column 8, lines 16-27), which corresponds to the claimed "the input string contains phonetic text and non-phonetic text and the first typing model is trained to the phonetic text and the second typing model is trained to the non phonetic text."

Regarding **claim 36** (depending on claim 33), as stated above, the combined system uses statistical model(s) (Chen: column 5, line 8) for both first language and second language (Chen: column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) text (interpreted as non-phonetic text) to be processed', 'entering phonetic Chinese (Pinyin and BPMF)), with training data in the languages (Mukaigawa: column 8, lines 16-27), which corresponds to the claimed "the first typing model is trained using Chinese and the second typing model is trained using English."

Regarding **claim 37** (depending on claim 33), as stated above, the combined system uses statistical model(s) (Chen: column 5, line 8) for both first language and second language (Chen: column 4, lines 23-61, 'allows a mixed Chinese and non Chinese (e.g., English) text (non-phonetic text) to be processed', 'entering phonetic Chinese (Pinyin and BPMF)), with training data in the languages (Mukaigawa: column 8, lines 16-27), which corresponds to the claimed "the input string contains Pinyin and English and the first typing model is trained to the Pinyin and the second typing model is trained to the English."

Regarding **claim 38** (depending on claim 33), the rejection is based on the same reason described for claim 4, because the claim recites same or similar limitation(s) as claim 4.

Regarding **claim 39** (depending on claim 38), Chen in view of Mukaigawa further discloses a mechanism (search engine) for converting the phonetic input into the Hanzi form (output) (Chen: column 4, lines 28-61) and processing non-Chinese words (column 11, lines 53-

55), which corresponds to the claimed "the search engine converts the input string to the output string."

Regarding **claim 40** (depending on claim 38), Chen in view of Mukaigawa further discloses a user interface to receive the input string and to display the output string in a common edit line (Chen: column 5, line 56 and Fig.1, 'graphical interface 1020', 'displays the Pinyin characters' and 'displays the Hanzi characters').

Regarding **claim 41** (depending on claim 33), Chen in view of Mukaigawa further discloses graphical interface 1020 (Chen: column 5, line 56 and Fig.1), processing of the text (Chen: column 6, lines 1-65), spell checked for non Chinese language and that computer recognizes the letters representing Pinyin syllable and the syllable is spell checked (Chen: column 11, line 47-63); a multilingual word processor (Mukaigawa: column 5, lines 20-32), which corresponds to the claimed "a word processor embodied on a computer-readable medium comprising the language input architecture".

Regarding **claim 42**, it recites a language input architecture. The rejection is based on the same reason described for claims 33, 38 and 40, because the claim recites same or similar limitation(s) as claims 33, 38 and 40.

Regarding **claim 43** (depending on claim 42), Chen in view of Mukaigawa further discloses the search engine converts the input string to one of the conversion strings when the first probability is higher than the second probability, (Chen: column 4, lines 28-61, 'converting the phonetic input into the Hanzi form (first language)'; Fig. 4 and column 12, lines 35-66, 'the most probable syllable is displayed 409'; Mukaigawa: column 10, lines 11-33, 'product of the occurrence probabilities of the character...is obtained as final evaluation value', 'the evaluation

value...is the largest (corresponding to the highest probability)'; column 11, line 11, 'a search engine').

Regarding **claim 44** (depending on claim 42), the rejection is based on the same reason described for claim 43, because the claim recites same or similar limitation(s) as claim 43.

Regarding **claim 45** (depending on claim 42), the rejection is based on the same reason described for claim 12, because the claim recites same or similar limitation(s) as claim 12.

Regarding **claim 46** (depending on claim 42), the rejection is based on the same reason described for claim 13, because the claim recites same or similar limitation(s) as claim 13.

Conclusion

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QH/qh
February 1, 2005

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